CHAPTER 5

TRIAGE : THE EVALUATION OF DISASTER CASUALTIES

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As a general rule the treatment of casualties in disaster situations has to be carried out under conditions of scarcity - scarcity of manpower, materials, time and space. This infers that optimal use of all available resources is essential.

Experience has shown that casualties may readily be classified according to the nature of their injuries. In assessing individuals for appropriate classification the nature, extent and severity of the injury, the urgence of treatment, and the existence of co-existing lesions are all taken into consideration. In any case classification should meet the following requirements : -

a. it should be to benefit of the victim,

b. it should fit into the existing disaster organization.

In practice some kind of spontaneous classification based on the requirements of the wounded will be catered for by early helpers at the scene, whether casual or organized.

It should be compulsory to determine classification according to one officially prescribed method thus obviating any further chaos which might result from deficiencies in the necessary organization.

Koenen's dictionary (1975) renders triage as the sifting-out, addressing and dispatching of an item. This implies that triage is the outcome of a series of existing and anticipated impressions each of which is indispensible in determining the ultimate chain of therapeutic events. Casualties unlikely to benefit from medical assitance should be segregated from those for whom intervention affords a reasonable prognosis.

Van der Slikke (1977) has drawn attention to the great diversity of interpretation of the concept of triage. The organizations involved with patient transport exhaust themselves categorizing casualties according to the nature of the injuries, i.e. classifying them according

to the urgency of treatment. Apart together from the question as to whether or not it is correct to base segregation on the urgency of treatment alone, one certainly is the lack of a common scheme of triage. In the Netherlands the Red Cross makes use of three categories whereas the Civil Defence recognizes four. The Army Medical Services compromise with a first-priority group succeeded by three subdivisions. All these schemes, although differing in the degree or seriousness of a given injury, have in common a classification based on the organs involved.

There are certainly demands for an alternative method of triage. Kirkpatrick and Youmans (1971) published a trauma index capable of being applied by ambulance personnel. This trauma index was modified by Ogawa and Sugimoto (1974) to include a scale ranging from 1 to 29. Their scale also recognized three groups namely slightly and moderately injured, seriously injured and critically injured.
De Boer and Baillie (1978) have abandoned all of these and classify casualties according to their demands on the medical organization as follows : -

I = victims with disturbance of the vital functions,
II = casualties sufficiently seriously injured as to require initial treatment and possibly subsequent surgery,
III = the slightly injured who may return home after treatment.

Broader Aspects of Casualty Appraisal

In determining a method of triage one has to aim at attaining the best possible end-result. There is need for a system of triage which not only decides priority but which also projects some assessment of the expectation of life following medical treatment.
Baker and her co-workers (1974) heve drafted a classification technique on a continuous scale which goed a long way towards satisfying these requirements. For this purpose a large-scale investigation of traffic accidents in the U.S.A. was held. Relegation of the victims to one or other category was related to the expectation of survival. Those who died at the site of the accident and those who succumbed during transportation to hospital were included. Selection was made according to a number of rough impressions, a general examination, the seriousness of the injury, the associated circulatory and respiratory signs, the

level of consciousness, response to painful stimuli and questioning, vomiting, the rate and character of the pulse, the blood-pressure, and the presence or absence urinary incontinence.

On this basis casualties could be accorded one of five different categories : -

1. slightly injured, 2. moderately injured,
3. seriously injured without danger to life,
4. seriously injured with a threat to life but reasonable expectation of survival,
5. critically injured.

Table 1. portrays examples of these various categories.

Table 1. Examples of Codes for Chest Injuries

Code	Injury Description
1	Muscle ache or chest wall stiffness
2	Simple rib or sternal fractures
3	Multiple rib fractures without respiratory embarrassment
4	Flail chest
5	Aortic laceration

This code was applied for each affected anatomical part, bearing in mind that the organ with the highest injury score would serve as a basis for further assessment. The result of such a triage in more than 2,000 victims is displayed in Table 2.

Table 2. Grade of Most Severe Injury

Most severe injury grade	Dead on arrival	"Admitted" Died later	"Admitted" Survived	"Admitted" Unknown	Total N°	Total Percent
1	0	0	80	1	81	(4)
2	0	2	437	1	440	(20)
3	6	23	997	20	1,046	(49)
4	13	30	229	3	275	(13)
5	93	80	97	3	273	(13)
unknown	1	0	12	0	13	(1)
Total	113	135	1,852	28	2,128	(100)
percent	(5)	(6)	(88)	(1)	(100)	

From this table it is obvious that no casualty (0%) relegated to category 1. died during medical treatment. For categories 2., 3., 4. and 5. the related percentages were 0.5, 3, 16 and 64 respectively. A number of casualties sustained injuries to more than one organ with, as a result, a poorer prognosis. It is not the case that victims with a class 4 injury to one organ and a class 3 injury to a second organ showed a (16 + 3 =) 19% mortality rate. Instead, the mortality was significantly higher than the sum of the two and was in fact 24%. When three or more organs were involved the respective figures became progressively worse; for example, serious intra-abdominal haemorrhage (category 5) associated with closed fractures (category 4) and a further category 3 injury resulted in a mortality of 92% - and not of (64 + 16 + 3 =) 83%.

Thus there appears to exist not a simple linear relationship but rather an exponential one.
There appeared to exist, therefore, a starting-point on which to base a uniform classification system. This scale, which Baker and her co-workers named the Injury Severity Score or I.S.S., was determined by selecting the sum of the squares of the categories of the most severely injured parts.
Of course, age does play a part and the older the casualty the poorer the percentages and the higher the mortality. Thus the I.S.S. indicates an exponential relationship between mortality figures and the number of organs involved.
The I.S.S. is a quantitative assessment and as such provides information which can be usefully applied when deciding upon further care of the disaster casualty.

Delay Time

As a general rule a casualty in need of surgical care ought to be afforded that treatment at the earliest possible opportunity.
When faced with a scarcity of the resources available. An all-important factor is the relationship between the prognosis of casualties with varying injuries requiring treatment and the interval of time elapsing between sustaining these injuries and the availability of surgical intervention. This latter period is called the delay time.
All sorts of trauma may present themselves in a disaster situation and the need exists for evaluation of the relationship between prognosis and delay time. There is a decided dearth of information in this area.
Useful information can be gleaned from the post-mortem analyses mentioned by Stephany (1976), which demonstrated that

1. a large proportion of the wounded who die from their injuries do so almost immediately. This applies particularly to lesions associated which disturbance of the vital functions.
2. the prognosis of the remainder becomes progressively poorer as the delay time is prolonged and a point of irreversibility is reached.

Clearly, the longer the delay time the higher the I.S.S.
The above should leave the reader in no doubt whatsoever that important decisions have to be taken at a very early stage in view of the shortage personnel, materials and time.

As a consequence of very serious or multiple injury (high I.S.S.) a proportion of the victims have an extremely slender chance of survival. One of the painful questions which have to be posed is to what extent the resources available may be expended on the unfortunate members of this group. One can hardly deny these facilities to casualties whose chance of survival is much greater. It is possible that the I.S.S. presents an index which may be employed, having regard to the casualty himself as well as to the material famine, in deciding whether a given victim may or may not be denied treatment.

The I.S.S. may also be usefully applied to casualties at the casualty assembly centre when deciding on priority of transportation.

It is a metter for debate whether even an expert possessing the appropriate knowledge and resources can or may make such decisions.

Not only can the I.S.S. be employed in assessing patients for transportation but it also be used in classifying those selected for transfer to hospital. Use of the score in this way may be of value in the ambulances and even in the hospital itself. The attendant accompanying a number of patients is thereby compelled to devote special attention to those with higher scores.

On arrival at the hospital the casualties are assembled in a location which lends itself to further evaluation of the incomers. Patients within a certain score range can be grouped together. This type of triage can be readily carried out at all stages where casualties are assembled between the disaster site and the hospital.

In view of the fact that the condition of a given patient is subject to alteration or deterioration it is of the utmost importance that classification of the injured be subjected to continuous reassessment. The danger lies in the fact that a score, once determined, is not subjected to reappraisal.

The uniform character of the triage described renders possible classification according to a number of factors including the urgency of treatment, transportability and prognosis, bearing always in mind that reassessment is essential, especially when the delay time is prolonged. There is a reason to investigate the relationship between the I.S.S. and the delay time prior to universal adoption of the method.

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